

## TCI/HS3 2014 17 Oct Flight Report: WB-57 Gonzalo Flight

Flight Scientists:

Shift 1 (1000-1800Z): Anthony Didlake, Chris Velden, Jim Doyle

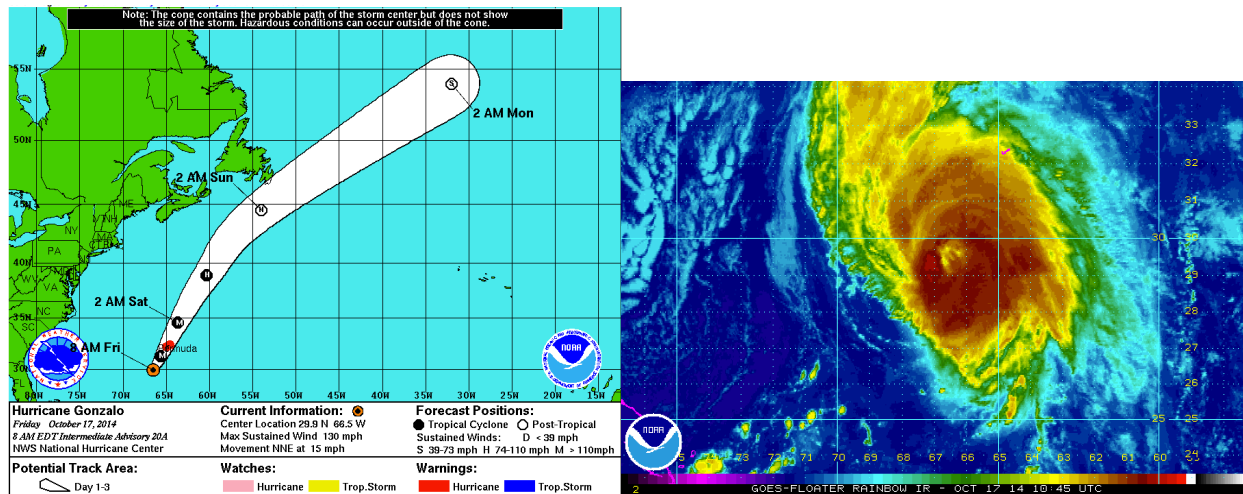
Shift 2 (1700-0000Z): Amber Emory, Steve Guimond, Pete Black

Pete Black and Gerry Heymsfield on site at MacDill

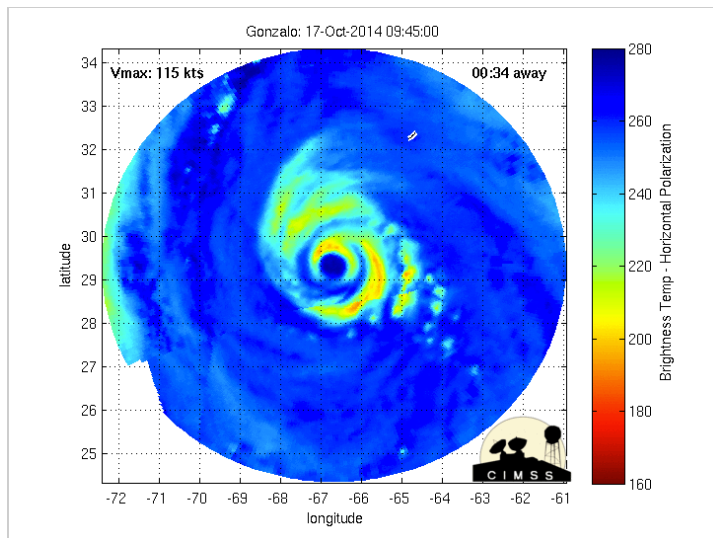
Takeoff: 1140Z

Landing:

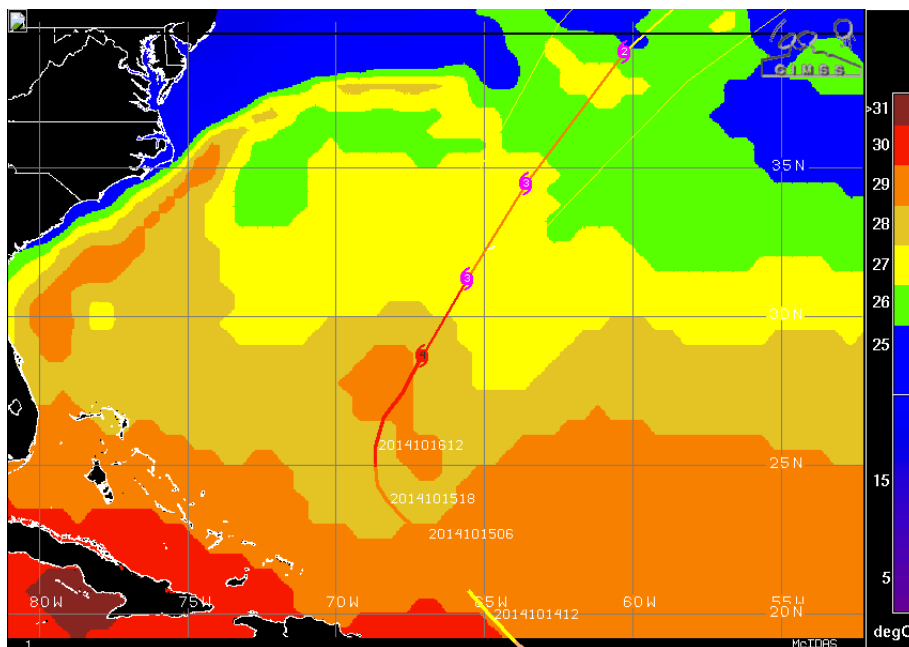
Mission goal: 6 hr science flight to investigate Hurricane Gonzalo as it approaches Bermuda.



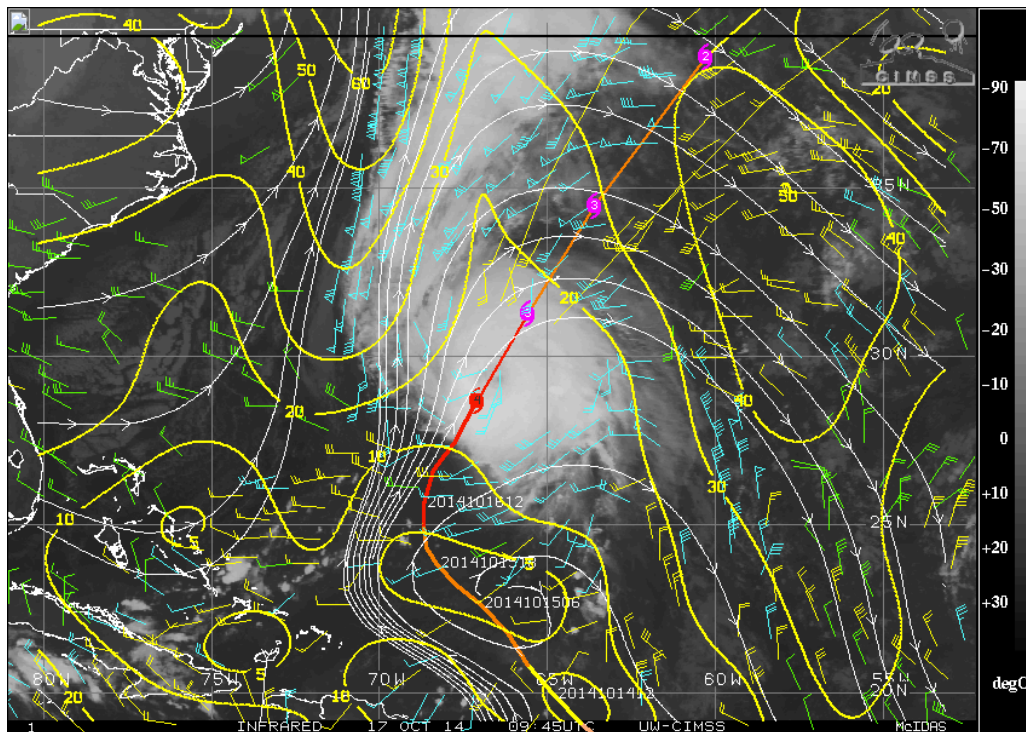
NHC 8am advisory has Gonzalo at 115 kts/946 mb. Currently moving NNE at 15 mph. Forecast is to continue current track and weaken slowly in the next 24 hours. Rapid weakening will follow as the environmental shear will begin to pick up. IR image shows decreased organization of the inner core from yesterday. Gonzalo has asymmetrical structure with cloud shield spreading to the north and east.



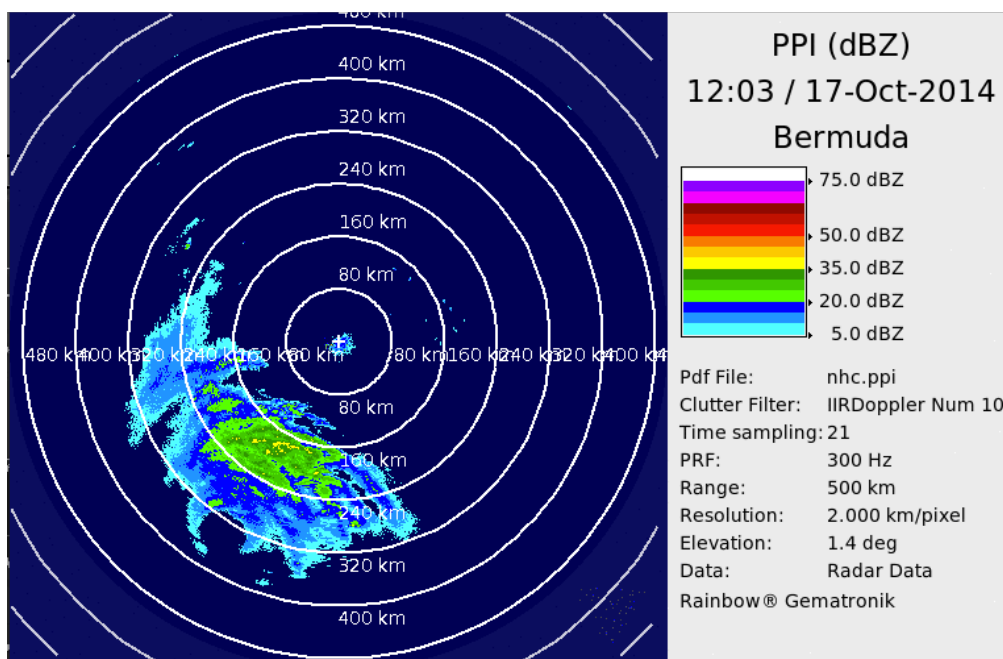
Gonzalo underwent an eyewall replacement cycle yesterday. MIMIC product from this morning shows rainbands beginning to axisymmetrize around the current eyewall, possibly beginning a new eyewall replacement cycle.



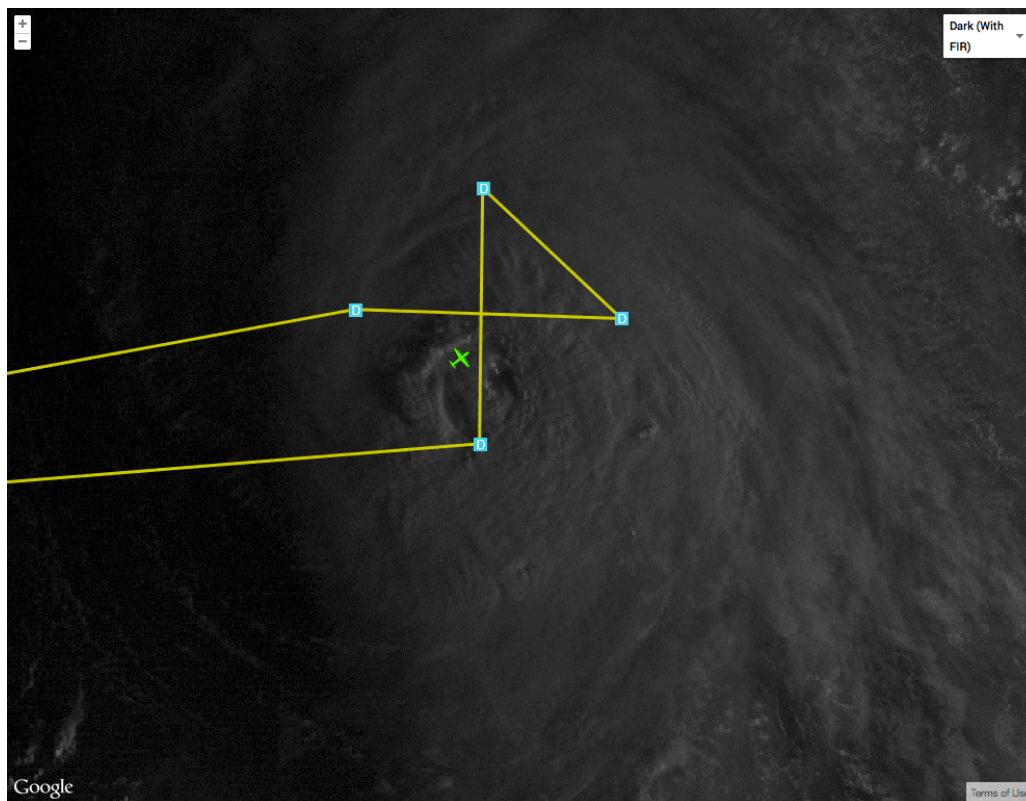
Gonzalo is currently over 28°C water and will move into 27°C in the next 24 hours.



Gonzalo is currently interacting with a frontal system that is bringing ~15 m/s SW shear over the storm. Strong outflow appears to the NW and another weaker outflow channel occurs to the S.

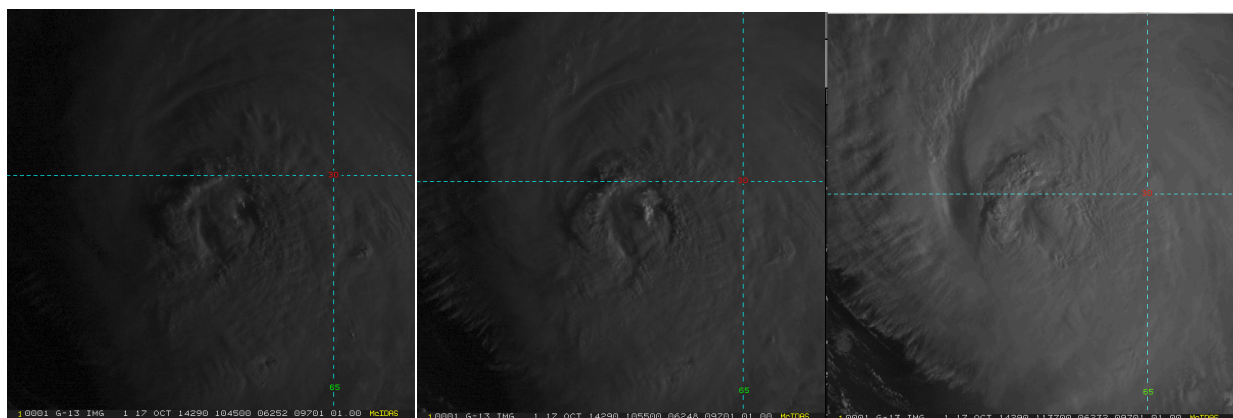


Forecasted track is to pass very close to Bermuda. Bermuda is under a hurricane warning. Eye of Gonzalo coming into view of Bermuda long range radar.



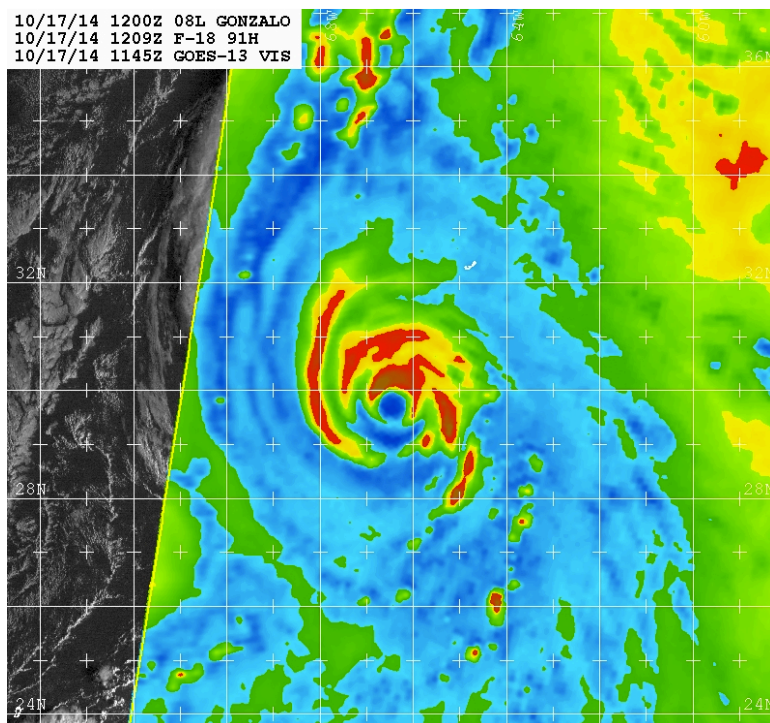
Current track plan with northern leg as inbound leg. The plane is loaded with 61 sondes. N43 is currently in the storm.

1140Z Takeoff from MacDill



Sunrise over Gonzalo.





1209Z Microwave image shows southern portion of eyewall very weak. Rainbands active to the W, N, and SE of storm center.

1235Z Plane out of range for real-time plane positions.

1316Z Current WB-57 position: -71.08, 28.82 and 18.6 km altitude

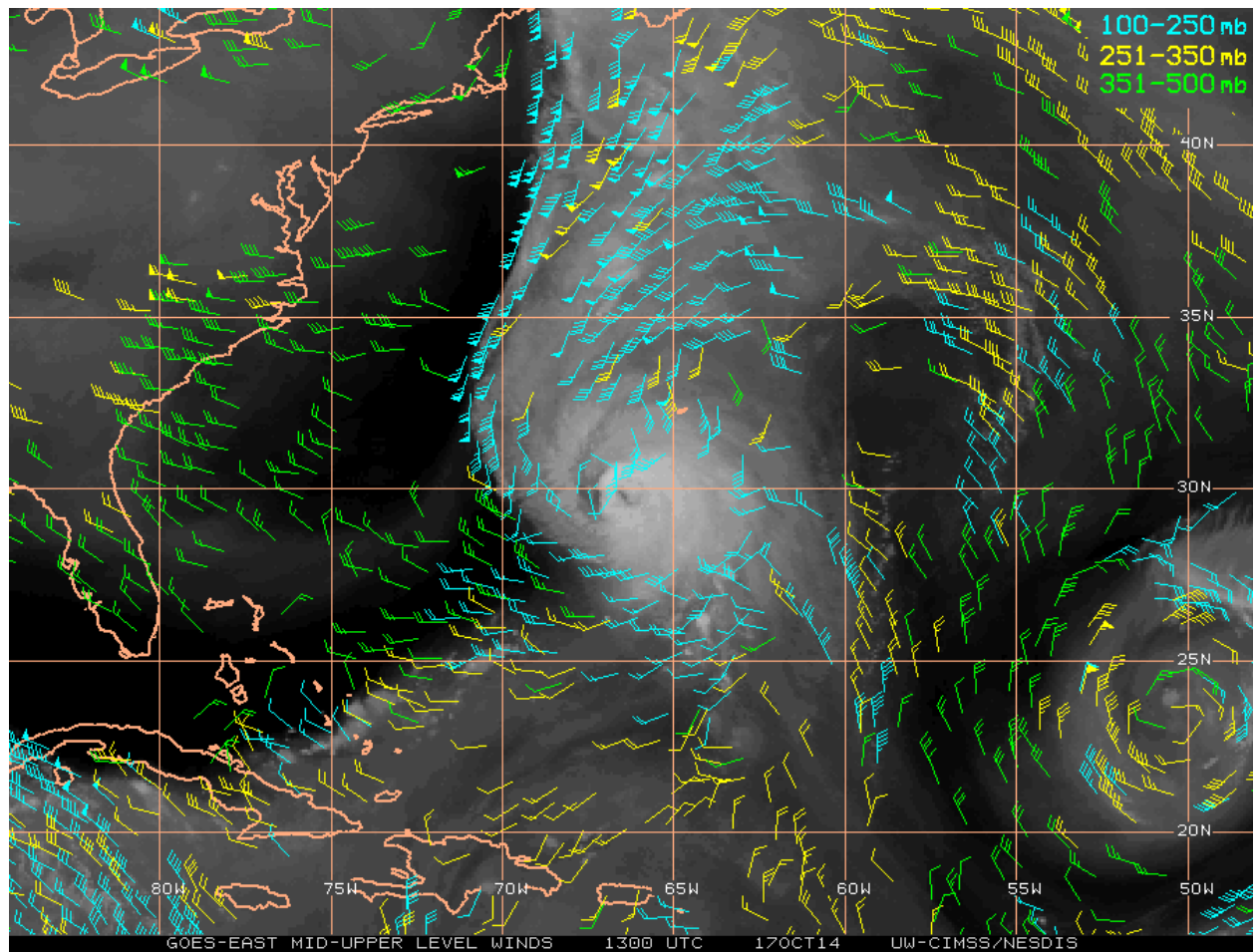
1322Z 420 kt ground speed, WB-57 is around 50 min to storm center

1337Z Current WB-57 position: -68.367, 28.777. 12 sondes have dropped so far.

1341Z 13 minutes from point #2, the southern point on the S to N leg

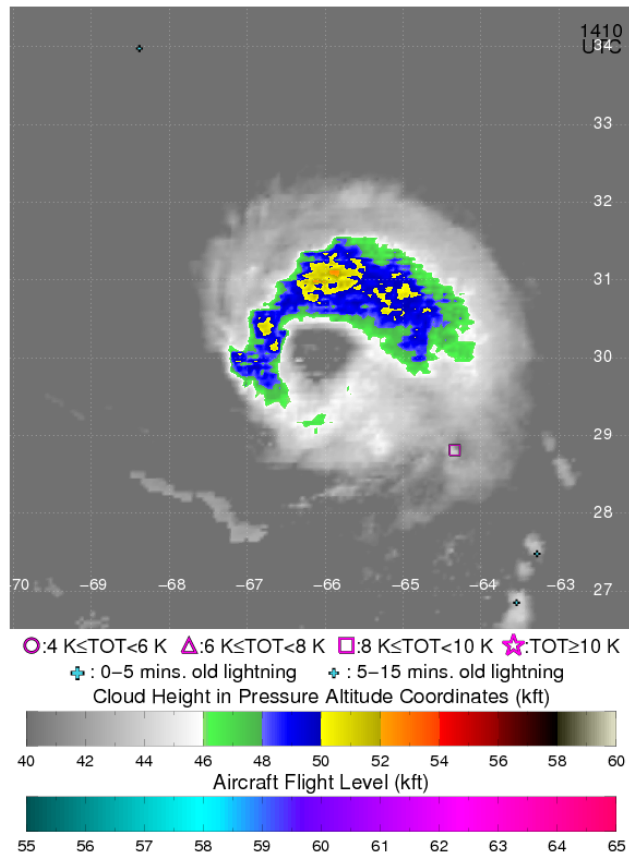
1343Z Storm seems to be accelerating. Using 30 deg 06 min and 66 deg 20 min for storm center.

1355Z Beginning S to N leg; sondes will be dropped every 10 nm in this leg.

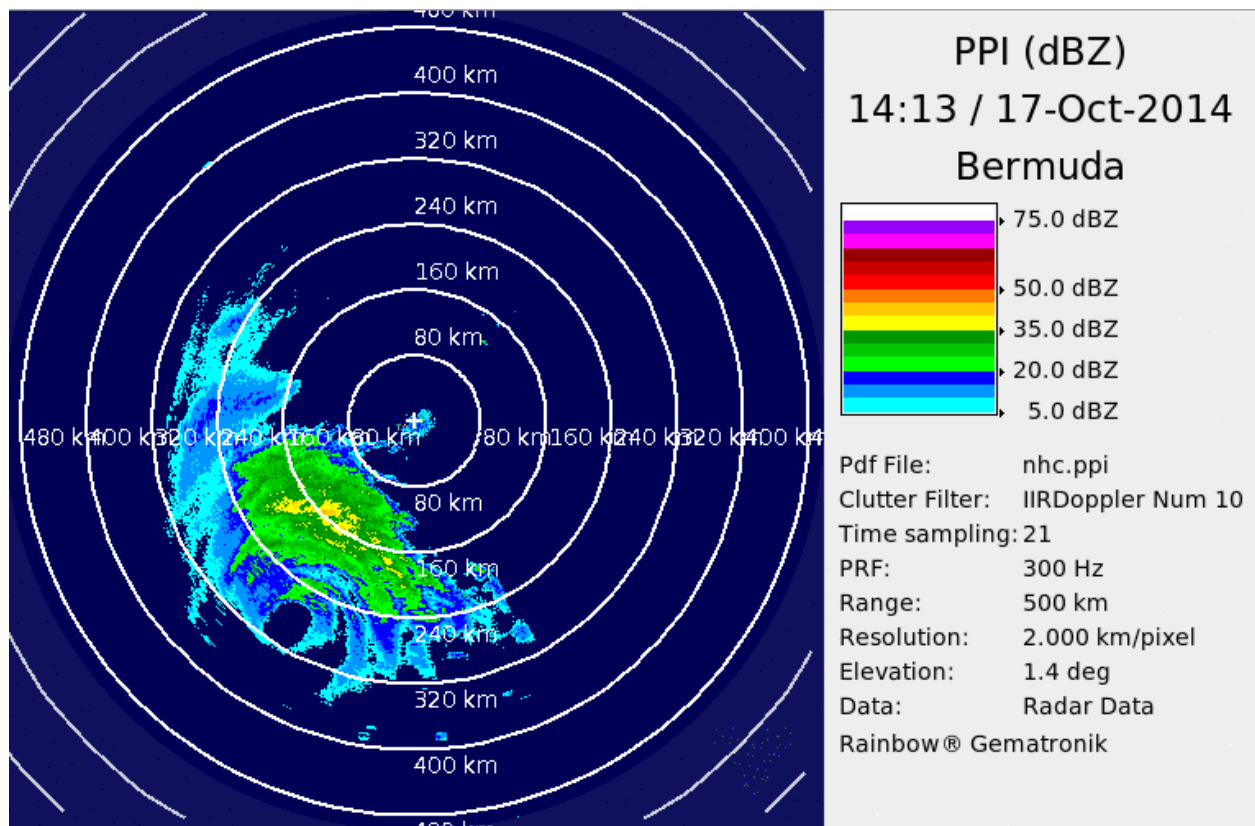


CIMSS AMVs valid at 1300 UTC: Show a well defined outflow region and interactions with the trough to the north.

Lightning & Aircraft on 20141017 at 1424 UTC  
 ACHA CTH & TOTs at time listed

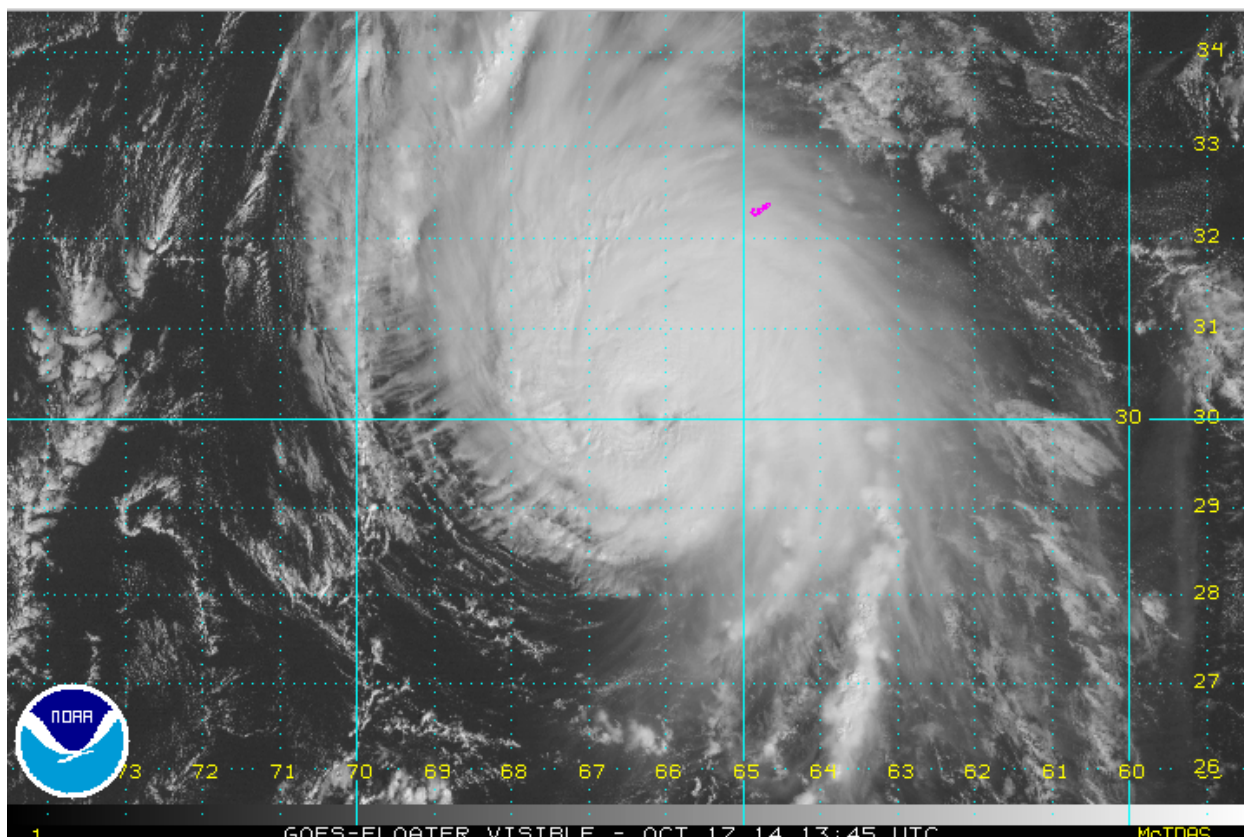


ACHA CTH and TOTs valid at 1424 UTC from CIMSS. The image shows a persistent region of high cloud tops in the north and west eyewall of Gonzalo, but the tendency for these tops is to become a bit lower with time over the past couple of hours.



The Bermuda radar at 14:13 UTC is shown above. The 08L eye is evident in the Bermuda radar with enhance echoes to the north.





Visible image for Gonzalo at 1345 UTC.

At 1413 UTC, Peter Black reports:

Finished 12 sonde rapid deployment across outflow jet boundary, i.e. edge of cirrus shield.

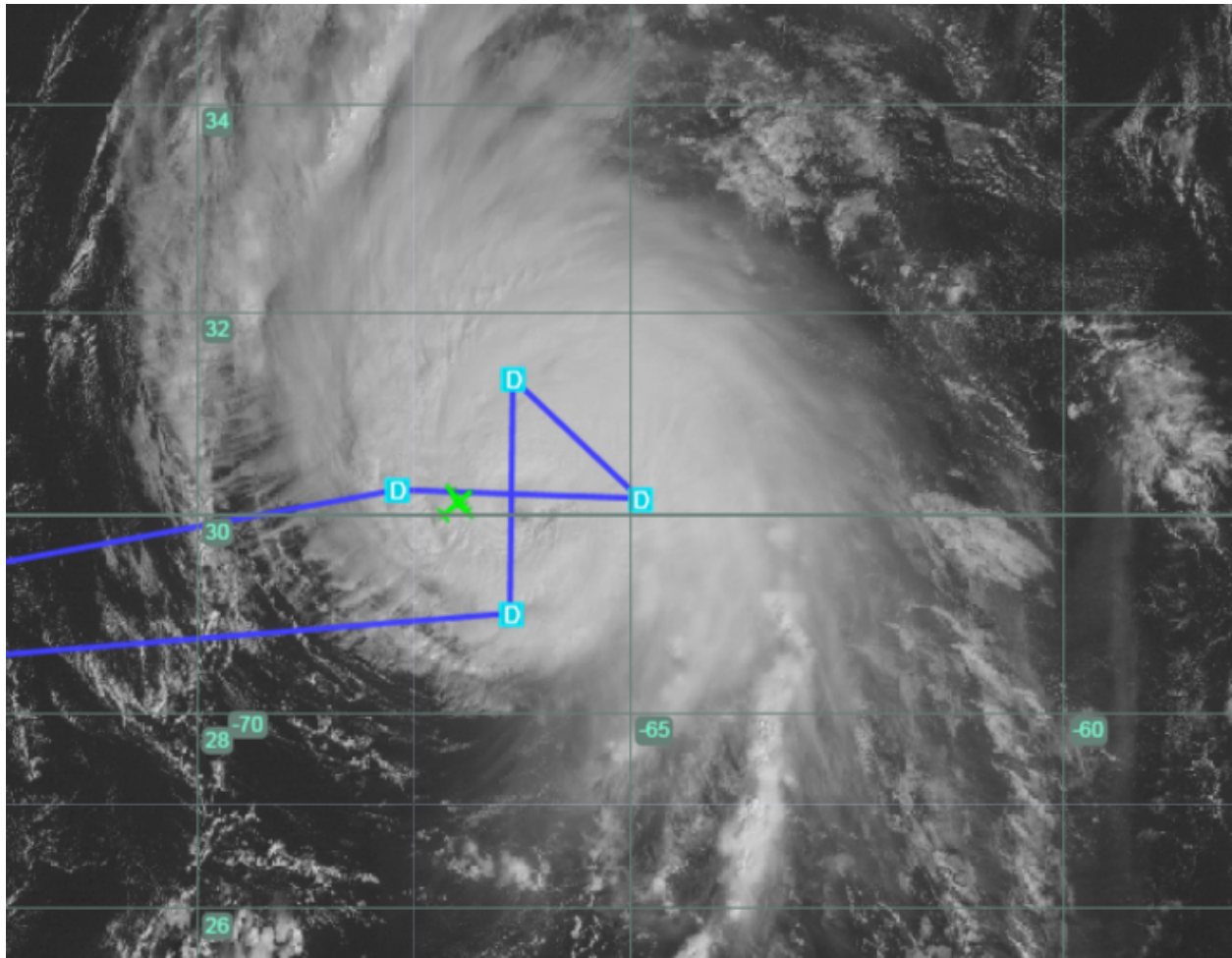
Started a bit too soon- but went well.

Started sonde launches every 90 sec from S point, i.e. every 10 nm.

just passed directly over eye and then directly over P3

From C. Velden

Satwinds showing eyewall outflow roots now connecting to approaching trough to NNW...drops data should be great to confirm this.

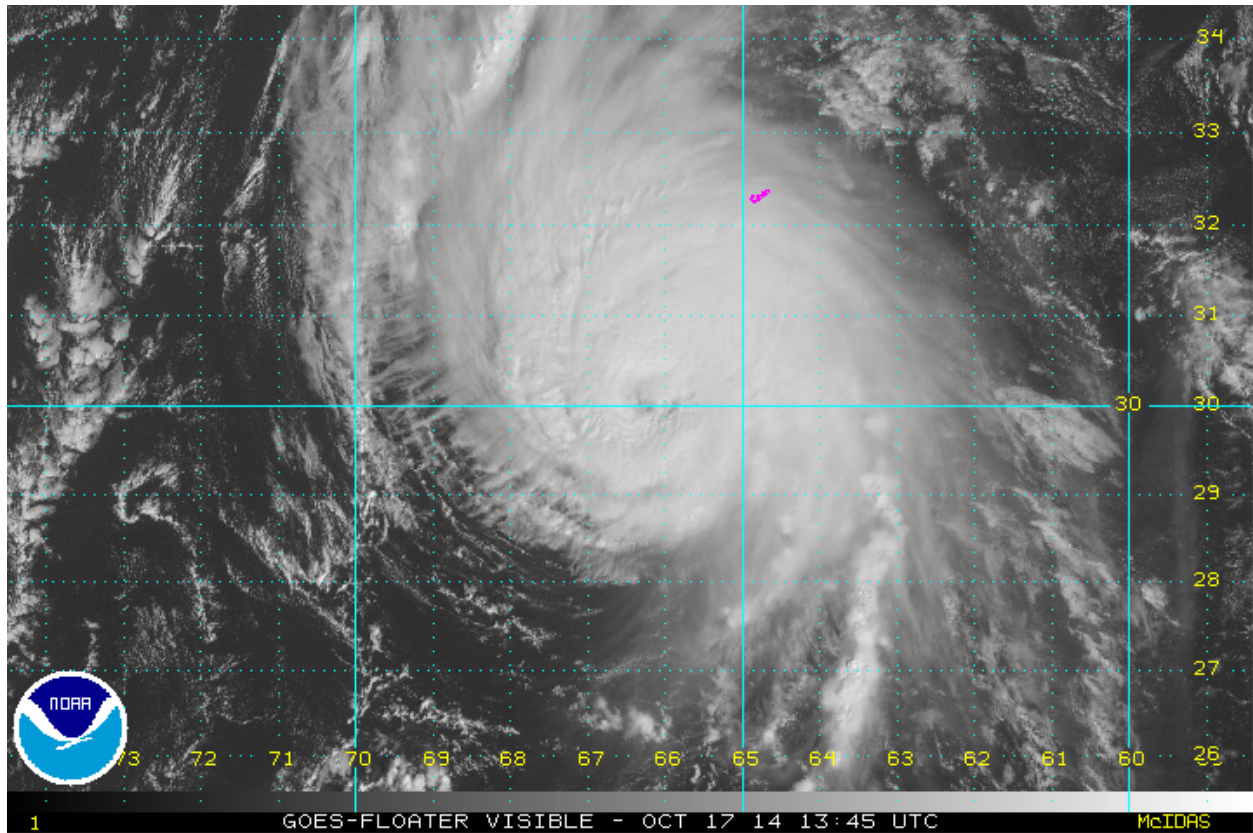


GOES visible and planned Track 1 for the WB-57 valid at 1442 UTC 17 October. Transverse bands apparent along the western edge of the storm.

gmheymsfeld: position is 29.60 & 69.635 with 6 sondes remaining 15:07:17

PAN:OK. then the 57 is on the way home now. 15:10:49

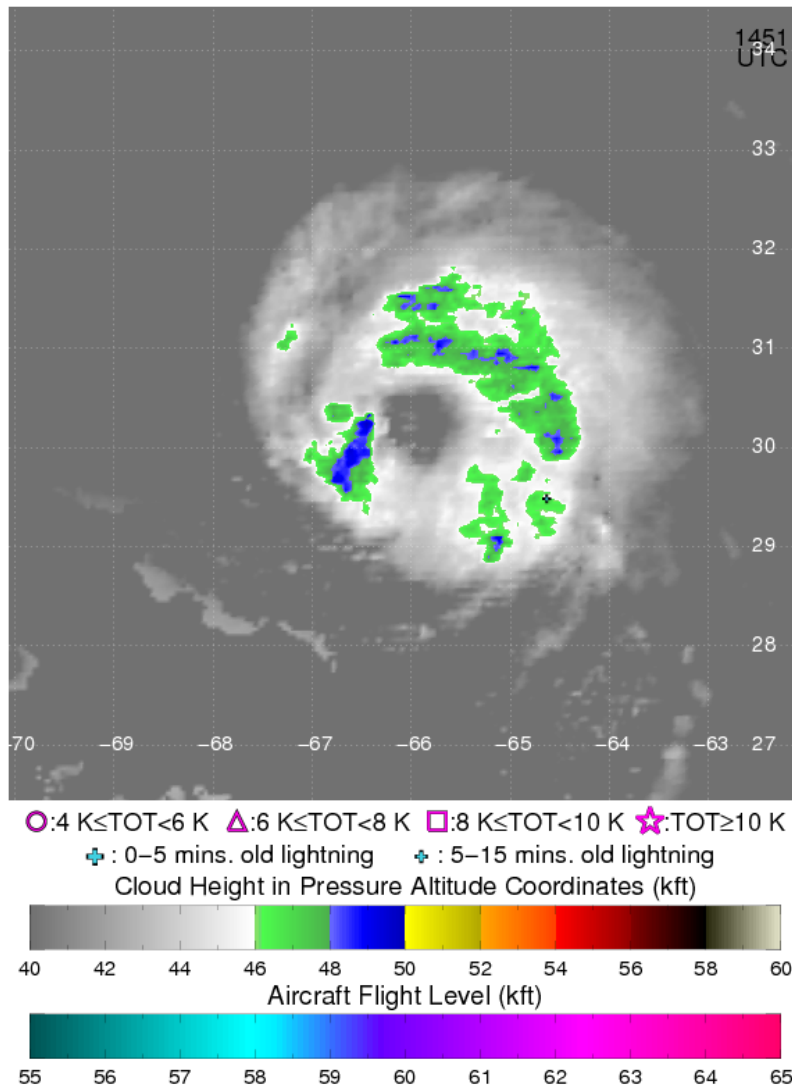
gmheymsfeld:yes, out of sondes now. I'll send a picture by email. 15:12:15

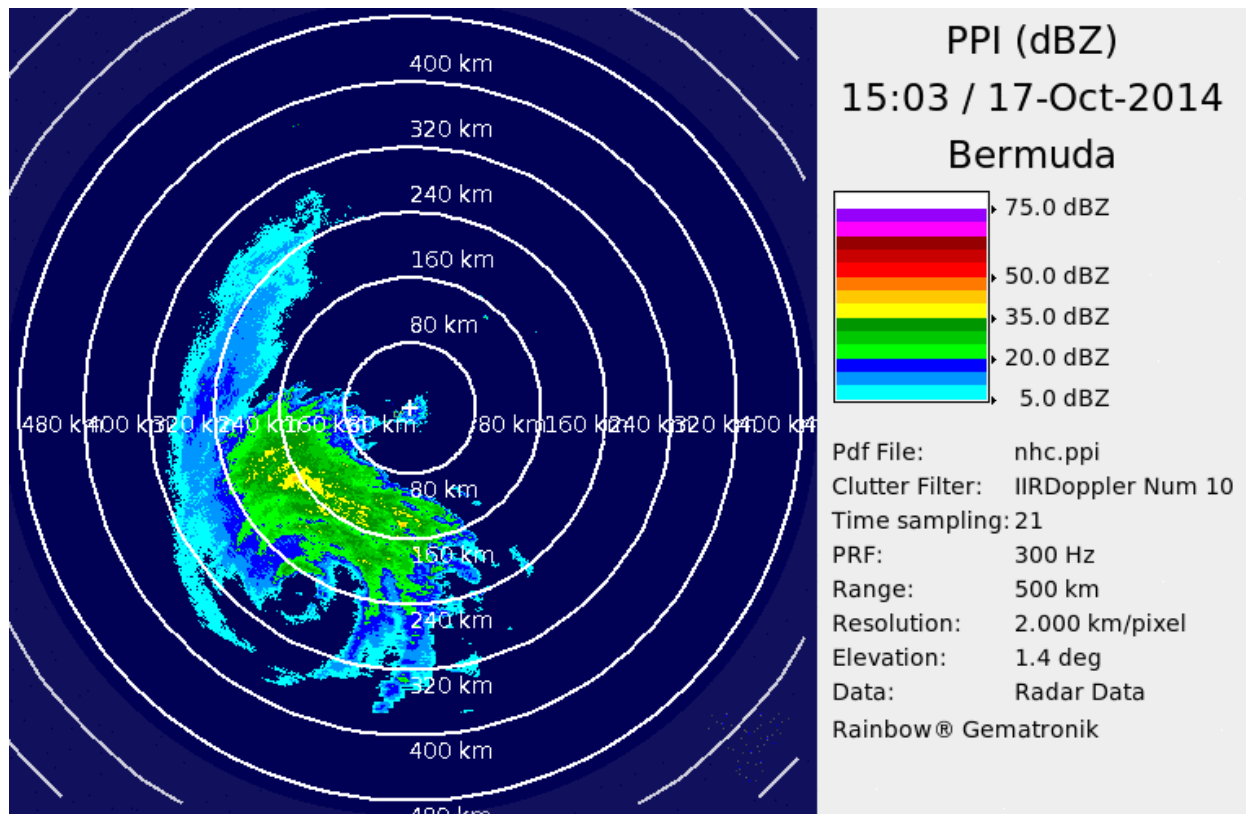


GOES visible valid at 1413 UTC of Gonzalo.

# Lightning & Aircraft on 20141017 at 1518 UTC

## ACHA CTH & TOTs at time listed





Bermuda radar valid at 1503 UTC 17 October.



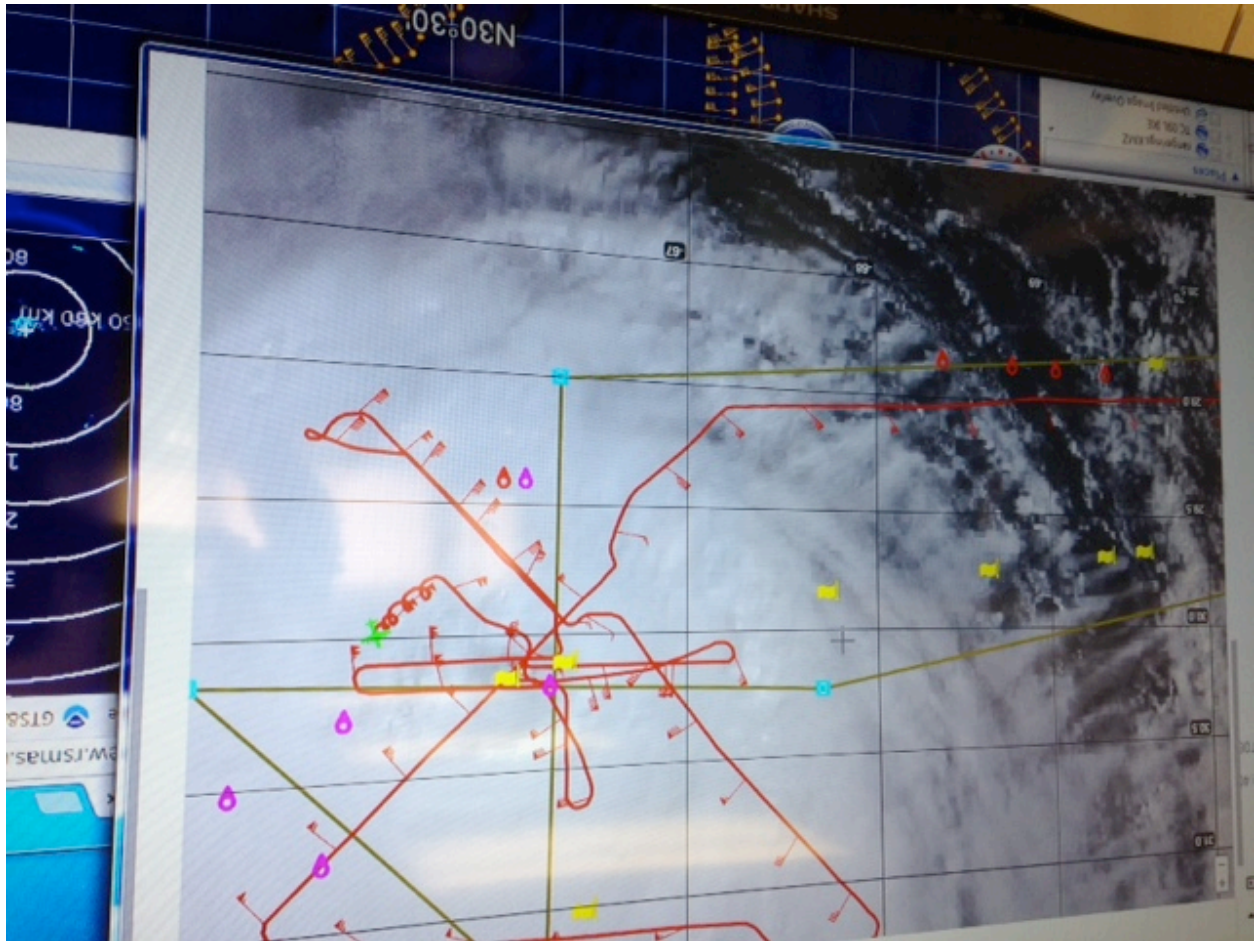


Image from Gerry Heymsfield showing the MTS display. N43 track in red with wind barbs.

Pins & flags of various colors show some sonde locations. Two overpasses of N43. Still some noise on sondes.

They dropped 12 sondes on the inbound across outflow boundary. String of 12 sonde on S-N track (a couple in eye),

8 sondes on the NW-SE track, 12 on E-W track. Began a sequence to capture outflow boundary - 17 sondes at 1 min intervals. Some in the dry air west of the center.

11 am EDT Discussion from NHC

Gonzalo is under surveillance by a NOAA hurricane hunter plane and its eye is in the scope of the Bermuda radar. Maximum winds measured so far by the SFMR on board the plane are 104 kt, and on this basis the initial intensity is lowered to 110 kt.

Summary from Pete Black:

Just a quick recap before we start packing up here at AOC to prepare to transport back to EFD- to begin this afternoon and continue through tomorrow. In summary, HIRAD and HIWRAP seemed to work just fine. We managed to fly over NOAA43 on the northbound leg. Rather

reverse: 43 managed to underfly our track from midway through the north leg to the endpoint, and then again as we were flying outbound from the center to the west (N43 flew inbound under our track- displaced just a bit to the north). A huge thanks to Paul Chang on N43 for arranging to make this happen along with N43 crew efforts.

All 61 XDD's were successfully deployed, bringing the three day total to 152 without a single launch failure. Sondes today were launched in manual mode from the aircraft cockpit by the WB-57 SEO- Tim Propp in this case, without a hitch, as compared to yesterday when 51 of 52 were launched remotely from AOC. Once again, cursory indications were that sondes performed well at first, i.e. in the upper levels close to the aircraft, and then experienced dropouts due to some unknown RFI source down low. Will know more on this within the next week to 10 days.

A string of 12 sondes were launched initially on the inbound transit at 1min (7 nm) intervals across the boundary of the outflow layer as indicated by the edge of the cirrus shield. Upon arrival at the south point IP, the WB turned northbound and dropped a sequence of 12 sondes from 75 nm south of the center to 75 nm north of center, including a 35 nm leg along the north leg, where we overflew NOAA43 and it slipped in behind us and flew along the same track. Then 8 sondes were deployed at 7 nm intervals along the diagonal to a point 75 nm east of the center. Then an additional 12 sondes were deployed along the westbound leg to 75 nm west of the center, passing directly over the eye once again. A string of 17 sondes were then deployed in rapid succession from the west end point, across the outflow boundary and into the clear air to the west.

The timing of the NOAA43 flight was quite fortunate, providing two fixes just before we began our north-bound leg to help hone in on the center location and direction/rate of movement, allowing us to basically nail the center, as far as I could tell. Tracking of the aircraft was once again done with SATCOM relayed GPS positions of the sondes in the dispenser- the only way we had for tracking the aircraft, an effort that was frequently interrupted by Internet outages. One of the most useful contributions was a magnificent effort by Aaron Duley at NASA Ames to bring up the Bermuda radar into MTS where we could overlay it, at reduced transparency, over the rapid scan VIS imagery that had been arranged by Chris Velden (resulting in 7 min sat images with no more than 5 min latency). This latter was also a huge, huge advantage in situational awareness with near zero latency.

And finally, we all owe the success of the past three days to a huge, unselfish team effort amongst over 100 HS3 colleagues, ESPO folks at NASA Ames, NRL colleagues, NASA colleagues especially Scott, Paul, Gerry, Lori, Jaime, etc, Yankee engineers, enthusiasm and professionalism of forecasters and flight planners, my dear NOAA colleagues here at AOC and so many others. In particular, this effort would have been impossible without Jason Dunion's tireless flight planning efforts. And it all starts at the top with Ron's emphasis on team play. I think we all can see the results of that now.